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**Share Buy-Backs in Germany  
Overreaction to Weak Signals?**

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### Abstract

This paper investigates the magnitude and the main determinants of share price reactions to buy-back announcements of German corporations. For our comprehensive sample of 224 announcements that took place between May 1998 and April 2003 we find average cumulative abnormal returns around -7.5% for the thirty days preceding the announcement and around +7.0 % for the ten days following the announcement. We regress post-announcement abnormal returns with multiple firm characteristics and provide evidence which supports the under-valuation signaling hypothesis but not the excess cash hypothesis or the tax-efficiency hypothesis. In extending prior empirical work, we also analyze price effects from initial statements of firms that they intend to seek shareholder approval for a buy-back plan. Observed cumulative abnormal returns on this initial date are in excess of 5% implying a total average price effect between 12% and 15% from implementing a buy-back plan. We conjecture that the German regulatory environment is the main reason why market variations to buy-back announcements are much stronger in Germany than in other countries and conclude that initial statements by managers to seek shareholders' approval for a buy-back plan should also be subject to legal ad-hoc disclosure requirements.

EFM classification: 330, 350

## **1. Introduction**

In May 1998 the “Corporation Control and Transparency Act” (KonTraG) abolished major restrictions for German corporations to repurchase their own shares. In the five years until April 2003, more than 180 German firms used the new freedom through some 240 share repurchase announcements.

This paper presents an event study that investigates the magnitude of share price effects from German buy-back announcements and a regression analysis that explores the determinants of these share price effects. We strive to reveal the motives of managers of German corporations to engage in buy-back transactions. Moreover, given that the German laws governing share buy-back plans differ in some important respects from the corresponding laws in other countries, we examine whether - and if so - why German equity markets react differently to buy-back announcements.

Motives of managers to buy back shares have been extensively discussed in the existing literature (see e.g. COMMENT/JARRELL 1991 and STEPHENS/WEISBACH 1998) so that we content ourselves with a brief overview. They can be grouped into two broad categories depending on whether they imply actions that are generally expected to be commensurate with the interests of (the majority of) shareholders or not. If positive or only insignificant abnormal share price reactions to share buy-backs are observed, motives from the first category should be more prevalent and vice versa.

Motives in line with shareholders' interest include attempts by management to convey their assessment to the markets that their corporation is undervalued. Assuming semi-strong capital market efficiency, managers - and in particular those of smaller corporations - can be assumed to have superior information on the prospects of their firm as compared to outside market participants. If they are convinced that the market capitalization of their company is considerably below the fundamental value attributed to the company based on their projections, buy-backs offer an instrument to bet on these projections and thereby to signal the manager's private information to the market. Moreover, low value firms should find it prohibitively costly to mimic the behavior of undervalued firms. Otherwise, AKERLOF'S (1970) lemons model would rule out positive price responses. If credible, however, the signal should lead to an appreciation of the share price and thereby benefit existing shareholders. Also in line with shareholders' interest are those share buy-back transactions that are financed with excess cash and that take place in jurisdictions where any capital gains induced by buy-backs impose a smaller tax burden on

dominant shareholder groups than dividend payouts. Excess of free cash flow gives rise to agency conflicts because managers might otherwise use the cash for negative net present value investments like fringe benefit consumption or empire building and thereby harm the owners of the firm (Jensen 1986). Although share repurchase announcements might indicate a poor set of investment opportunities, they offer management an alternative instrument to dividends to return excess cash to shareholders and thereby to reduce principal-agent conflicts. Investors' prior beliefs regarding the probability that managers will actually pay out excess cash should be a positive function of the alignment of manager interests with investor interests. Alignment is typically attained through incentive-based manager compensation contracts or through the concentration of control rights in the hands of larger blockholders, who have stronger incentives to monitor and discipline management than dispersed owners (SHLEIFER/VISHNY 1986). As a consequence, repurchase announcements by firms with aligned interests should not come at a large surprise to investors. A similar argument applies to situations in which investors judge that repurchases are a more tax-efficient means than dividends to pay out an anticipated amount of cash to shareholders. The repurchase announcement then only reveals the actual choice by management and again does not convey much new information.

A further reason to buy back shares arises in the context of stock- or option-based compensation plans established by the firm in question. It can be safely assumed that the transaction cost related to a seasoned equity offer exceed that of a buy-back plan, so that buy-backs are typically a more cost-efficient way to obtain the shares to be distributed among employees. Such a buy-back transaction should by itself not lead to strong equity market reactions and hence, should not destroy shareholder value because the ramifications of the compensation plan can be assumed to be known *ex ante*. Finally, buy-back announcements might convey management's goal to obtain a tax-efficient currency to finance future growth through mergers and acquisitions. Typically, an exchange of shares is more tax-efficient for the target firm than the receipt of cash. This might *ceteris paribus* – i.e. irrespective of the value potential of the transaction itself – lead to a lower price and hence should be considered to be commensurate with the interests of shareholders.

The second, much smaller, category of buy-back motives includes management's efforts to repel takeover attempts that would actually increase the value of the combined entity but reduce private benefits for managers. By reducing cash reserves and at the same time reducing the amount of shares that can be purchased by raiders, managers seek to

prevent changes in corporate control and thereby to entrench in their positions. Managers who undertake buy-backs in defensive situations might hence act solely in their own interest and possibly at the expense of shareholders. Another situation in which the interests of at least one group of shareholders are violated arises when shares are repurchased at a premium from a specified group of shareholders, or more generally, when corporate insiders use repurchases to engage in informed trading at the expense of outside shareholders (IKENBERRY/VERMAELEN 1996). Finally, managers who hold a substantial equity stake in their firm might launch a repurchase program in an attempt to dilute the control of other shareholder groups. Even if these other shareholders are not willing to tender their shares a negative value impact might arise from the nontrivial transaction cost associated with the attempt.

In our study on 224 buy-back announcements we find average cumulative abnormal returns of 7.0% for an event window that starts on the day prior to announcement and extends for twelve days, indicating that motives from the first category prevail in Germany. A regression analysis based on a comprehensive dataset with detailed company information furthermore reveals that abnormal returns are negatively correlated with a firm's size, its market-to-book ratio and the past performance of its shares. We interpret this as strong evidence in favor of the undervaluation signaling hypothesis. We also find that abnormal returns are a negative function of a variable that attempts to capture investors' perception whether a given firm is a potential takeover target or not. This result indicates that buy-backs as a takeover defense destroy shareholder value. In a separate event study we investigate abnormal returns around the date at which the corporation launches a public statement that it plans to buy back own shares at some point in the future and that it therefore intends to obtain the legally required shareholder authorization for a buy-back plan during the next annual general meeting. Cumulative abnormal returns around this initial statement, which typically precedes the actual buy-back announcement by several months, amount to  $CAR [-5;-5] = 5.2\%$  on average. In comparing our results to the existing literature we find that total abnormal returns from planning and announcing share buy-backs are considerably higher in Germany than in most other countries. We conjecture that the strict German legal ramifications are responsible for this observation.

The remainder of the paper is structured as follows: The next section gives a brief overview on the legal framework governing buy-backs in Germany. Section 3 reviews the

extant literature and section 4 describes the data we use and the methodology we apply. Section 5 presents and discusses our empirical results. The last section concludes.

## 2. Share Buy-Backs in Germany

We treat ‘share buy-backs’ or ‘equity repurchases’ as synonymous notions for a transaction through which a corporation repurchases some portion of its outstanding shares in the open market or through a tender offer. Since the Corporation Control and Transparency Act (KonTraG) became effective on May 1, 1998, German corporation have been permitted to buy back common and preferred shares under the following conditions and subject to the following requirements, respectively. The volume of shares to be repurchased must generally not exceed 10% of nominal share capital<sup>1</sup> and only funds that could have otherwise been paid out to shareholders in the form of dividends can be disbursed for repurchase transactions. All shareholders of the corporation must be treated the same. The firm must not repurchase its shares for the purpose of trading. Repurchases (but not any subsequent sale of repurchases shares) have to be authorized by the annual general meeting of shareholders (AGM). The AGM has to decide on the maximum amount of shares to be repurchased, on the time horizon over which transactions can take place (maximum of 18 months), and on the method of repurchasing, if the corporation does not intend to repurchase through the open market.<sup>2</sup> When management decides to actually repurchase shares it is required to announce the decision to the public. There is no requirement at this point in time, however, to state the motivation for the decision or to report the planned volume of shares to be repurchased. Moreover, German regulators do not deem the announcements that a repurchase plan will be proposed to the AGM, nor the approval of such a plan by the AGM as a fact relevant for the valuation of securities and hence both

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<sup>1</sup> Share buy-backs in accordance to section 71 (1) Nr. 6 of the Aktiengesetz (German Stock Corporation Act – AktG) that serve the sole purpose of reducing a corporation’s nominal capital are an exception to this rule. A five-percent threshold applies to financial institutions trading in their own purposes (section 71 (1) Nr. 7 AktG). The law does not specify whether the thresholds apply to the total stock of repurchased shares held in treasury or solely to one 18-month period. In the latter case, firms could in principle buy back a substantially higher portion of own shares by obtaining AGM approval in subsequent years. For a discussion of this ambiguity see Kraft/Altvater (1998) and Bosse (2000).

<sup>2</sup> Existing types of non-open-market buy-backs include: *Fixed-price tender offers*, where the corporation offers to buy a specified amount of shares at a fixed price - typically exceeding current market prices - during a fixed tender offer period; *Dutch-auction tender-offers*, which are similar to fixed-price tender offers, except that prices are set in a book-building procedure; *targeted buy-backs*, where the corporation negotiates with a particular shareholder over the purchase of a block of shares. For a detailed overview on existing types of buy-back transactions see e.g. Lamba/Ramsay (2000).

incidents are not subject to ad-hoc disclosure requirements that were introduced by the 2<sup>nd</sup> Financial Market Promotion Act from 1994.<sup>3</sup> Figure 1 shows the average number of weeks that elapsed between the three events for the firms in our sample. During the AGM that follows any share buy-back transaction, management has to inform shareholders on the motives that underlay the transaction, its volume and the price paid per share. Finally, under German law, repurchased shares held in treasury are not entitled to voting rights and dividend payouts. As a consequence, dividends per outstanding share will *ceteris paribus* be larger after a share buy-back transaction.

German legal ramifications for share buy-backs differ along some important lines from US regulations. In the US, share repurchase programs do not require approval by the annual shareholders' meeting but only by the board of directors. Repurchasing transactions need not be publicly announced and the periodical transaction volume is neither capped by a 10% threshold nor by the amount of funds available for dividend distribution. Furthermore, transactions do not have to take place during a specified 18-month time window. STEPHENS/WEISBACH (1998) report that it is not uncommon that open market programs spread out over several years. Taken together, German firms have less leeway in tailoring a repurchase program to their objectives, thereby ruling out, or at least strongly mitigating, the motives that we discussed in the introduction as not being commensurate with shareholders' interests.

Insert Figure 1 here

Firstly, the requirement of equal treatment of all shareholders in combination with the obligation to obtain AGM authorization for repurchasing shares through tender offers or targeted buy-backs strongly impedes wealth transfers from one shareholder group to another. As a matter of fact, a mere four out of the total of 237 buy-back transactions in our sample were not conducted over the open market.<sup>4</sup> Secondly, because the amount of equity to be repurchased is capped at 10% of total capital, the effectiveness of buy-backs as a

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<sup>3</sup> However, section 71 (1) Nr. 8 requires management to immediately report the authorization by the AGM to Germany's financial services authority (BaFin).

<sup>4</sup> Those are AGIV (4-Apr-00, fixed-price tender offer to common shareholders), Friedrich Grohe (7-Oct-99, fixed-price tender offer to minority holders of preferred stock), Kögel Fahrzeuge (7-Dec-98, fixed-price tender offer to common shareholders) and Krones AG (18-Jan-99, Dutch auction tender-offer).



takeover defense device is limited. We hence expect to observe negative abnormal share price effects from announcements of share repurchases only in a few cases.<sup>5</sup>

The flipside of the stricter legal ramifications is that managers might feel constrained in signaling private information or in disbursing excess cash to shareholders. According to COMMENT/JARRELL (1991), in more than a fifth of all US open market repurchases between 1984 and 1989, firms sought to buy back more than 10% of outstanding shares. The authors also show that this group of firms experienced substantially greater average excess returns after buy-back announcements than firms with low-fraction repurchases. Because announcements regarding the repurchase volume are neither mandatory nor binding in Germany, it does not come as a surprise that the vast majority of German firms in our sample announced that it planned to buy back shares up to the maximum amount approved by the AGM. This apparent pooling equilibrium renders any non-binding provision of information regarding repurchase volume useless for investors and therefore depletes German managers of an extra choice variable.<sup>6</sup> Therefore, only the announcement itself can be used for signaling. We argue that German legal requirements and the threat of a reputation loss impose significant ex post signaling cost to firms that do not intend to repurchase after an announcement, thus allowing for a separating equilibrium in repeated games. Non-repurchasing firms and firms that buy back only a trivial amount of their shares must reckon that regulators suspect price manipulation and initiate investigations. Shareholders of these firms will most likely also make inquiries, possibly calling into question the managers' reputation for truthful disclosures. Repurchasing and immediately reselling shares is neither a viable option for this type of firms because such behavior would certainly be viewed as trading in own shares, which is explicitly ruled out by law. As a consequence, the repurchase announcement allows firms to convey information that might induce investors to update their beliefs about the firm's future prospects and about the mitigation of principal agent conflicts regarding the use of free cash flow, respectively.

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<sup>5</sup> Further explanations for negative price effects are that the announcement induces investors to reassess the firm's set of profitable investment opportunities or any value-diluting characteristics of stock-based compensation plans. Another explanation is of course that unobserved events that coincided with the buy-back announcement confound the measurement of share price effects from share buy-backs.

<sup>6</sup> GERKE ET AL. (2002) report that their 156 German sample firms on average only bought back 3.2% of outstanding shares. Rational investors will hence use this prior belief when assessing signal strength.

### 3. Related Empirical Literature

The empirical literature on stock buy-backs has so far largely focused on US markets. A number of clear-cut results have emerged. Share repurchases lead to significant positive abnormal returns on average, but stock price reactions to tender offers are at least twice as large than stock price reactions to open market transactions. MASULIS (1980), DANN (1981), VERMAELEN (1981) and COMMENT/JARRELL (1991) found abnormal returns from fixed price tender offers well in excess of 10% and an average premium over market price of more than 20%. According to Comment/Jarrell (1991) Dutch auction tender offers lead on average to an abnormal return of 8% during the three days following the announcement. In contrast, open market transaction by US corporations were found by virtually all studies to result in much smaller abnormal returns of around 3% (see Table 2).

The studies cited so far provide strong evidence for the validity of the signaling hypothesis. IKENBERRY ET AL (1995) observe a strong negative correlation between the market-to-book ratio before the buy-back announcement and the extent of positive abnormal returns thereafter. Abnormal returns were also found to be larger for firms whose stocks underperformed the market during the days before announcement (STEPHENS/WEISBACH 1998, COMMENT/JARRELL 1991 and IKENBERRY ET AL 1995). Both results reconcile neatly with the view that the signaling effects are stronger the higher the potential for an actual undervaluation. VERMAELEN (1981) shows evidence that the strength of the signal is also a function of its credibility. He discovers that abnormal returns increase in the amount of shares held by management as well as in the repurchased portion of outstanding equity (see also COMMENT/JARRELL 1991 and IKENBERRY ET AL. 1995). The more manager wealth is at risk, the more credible is a signal that the firm's stock is indeed a bargain. Finally, the extent of information asymmetries between management and investors also seems to have a bearing on signal strength. IKENBERRY ET AL. (1995) document that abnormal returns from buy-back announcements decrease in firm size. Arguably, smaller firms disclose less information to capital markets and are less researched by institutional investors, rating agencies and equity analysts. Taken together, buy-backs seem to serve as a credible signaling device for managers who seek to convey to investors that the market capitalization of their firm is lower than its true value.<sup>7</sup>

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<sup>7</sup> Further studies that underscore this insight include NETTER/MITCHELL (1989) and BARTOV (1991). WANSLEY ET AL (1989) directly assess buy-back motives by means of questionnaires and found that perceived undervaluation was indeed one of the most frequently quoted motives.

The results for other countries are broadly in line with those for the U.S. Cumulative returns around the announcement day are on average strictly positive (see Table 2) and most studies document evidence corroborating the signaling hypothesis.

Insert Table 1 here

A few studies measured market reactions to announcements of share buy-backs that could be considered to be used by management as a device to fend off a hostile takeover. DANN/DEANGELO (1988), DAVIDSON/GARRISON (1989) and DENIS (1990) observe negative abnormal stock price returns and thereby corroborate the hypothesis that this type of buy-back transaction violates shareholders' interests.

SHOVEN/SIMON (1987), BAGWELL/SHOVEN (1988), EVANS ET AL (2000) and LI/MCNALLY (1999) have explicitly tested the validity of the free cash flow hypothesis. They find a positive correlation between abnormal returns and measures for excess funds at the discretion of management. They conclude that buy-backs are an effective means of convincing the market that shirking and investments into poor projects is curbed. In addition, STEPHENS/WEISBACH (1998) observe that firms with more excess cash *ceteris paribus* tend to buy back larger volumes of shares, indicating that repurchases serve to reduce excess cash.

To our knowledge only two empirical studies exist on buy-backs in Germany. SCHREMPER (2000) analyses 120 buy-back announcements between May 1998 and December 2000 and finds significant abnormal returns of around 4%. The sample of GERKE ET AL. (2002) comprises 156 buy-back announcements for which the authors find average abnormal returns on the announcement day of 6.1%. They subdivide their sample to measure differences in abnormal returns between a) firms that either belong to the DAX 100 index (+2.7%), the Nemax index (+9.0%) or the small cap index (+4.8%), b) firms that either stated undervaluation (+8.9%) or the exchange of cash into a superior acquisition currency (+5.2%) as their main repurchasing motive, and c) firms that bought back shares during the general upturn of German equity markets between May 1998 and February 2000 (+3.7%) and firms that bought back shares during the subsequent bear market (+7.1%). We extend the work of both SCHREMPER (2002) and GERKE ET AL. (2002) by using a larger sample size, by investigating price effects around the initial disclosure of the intention to

buy back shares and by conducting multivariate regression analyses on a richer set of independent variables.<sup>8</sup>

#### 4. Methodology and Data

We conduct a standard market-model event study to measure price effects from buy-back announcements. Price effects correspond to abnormal returns, or equivalently, excess returns on a firm's stock on the announcement day [0] or over a short time window around that date (e.g. days [-1;+1]), respectively. Abnormal daily returns ( $AR_{it}$ ) are defined as the difference between the observed share price return ( $R_{it}$ ) on that day and an estimated "normal" daily return ( $R_{it}^*$ ), which is derived from a market model. We use daily share price returns during the time window [-270;-60] and the ordinary least square (OLS) model in (1) to estimate the parameters for the market model.

$$(1) \quad R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad \text{for } t = -270, -269, \dots, -60 \quad \text{with} \quad E(\varepsilon_{it})=0 \quad \text{and} \\ \text{var}(\varepsilon_{it})=\sigma^2(\varepsilon_{it})$$

The estimators and the daily market return are entered into (2) to obtain the estimated return  $R_{it}^*$  for share i.

$$(2) \quad R_{it}^* = a_i + b_i R_{mt}$$

The t-statistics from equations (2) and (3) are used to test the Null-hypothesis that abnormal returns on a particular day and cumulative abnormal returns for a given period [t; t+n], respectively, are not different from zero:

$$(3) \quad t = AR_i / \sigma(AR_i) \quad \text{with } \sigma(AR_i) \text{ equal to the standard error of the estimate from} \\ (1)$$

$$(4) \quad t = CAR_i^{i+n} / \sigma(CAR_i^{i+n}) \quad \text{with } \sigma(CAR_i^{i+n}) = \sqrt{n} \cdot \sigma(AR_i)$$

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<sup>8</sup> Our regression analysis shows that the price effect from being listed on a particular market might indeed be spurious and rather be driven by firm size.

Daily stock returns are computed as the difference between the logarithms of stock prices at market close of day  $t$  and day  $t-1$ . Stock prices were sourced from Datastream. For  $R_{mt}$  we used the broadly defined Composite DAX (CDAX) index.

We conducted a variety of key-word searches on the SDC M&A database of Thomson Financial, the news databases of Reuters, Bloomberg and Factiva as well as the Ad-hoc Announcements Database of the Deutsche Börse AG in order to identify buy-back announcements by German firms, which - by definition - had already obtained AGM approval. For the period from May 1, 1998 to April 11, 2003 we found 181 companies with a total of 237 such individual share buy-back announcements. Figure 2 shows the number of announcements per month. The observation that announcements occur in waves points to a conscious timing of the share buy-backs by the firms. We can think of two explanations for this phenomenon. Firstly, managers might attempt to improve the share price performance towards the end of the company's financial year in order to produce better valuation ratios. Secondly, given that firms do not wait until the end of the predetermined 18-month period and given that AGMs typically take place in April or May one should expect the bulk of buy-back announcements to occur in the second half of the year. We also searched the database of Germany's financial regulator BaFin ([www.bafin.de](http://www.bafin.de)) for reported AGM approvals of buy-back plans. From May 1998 until April 11, 2003, 483 corporations sought an AGM approval for a total of 785 buy-back plans. Taking into account that buy-back announcements occur on average 21 weeks after an AGM, we arrive at a relevant universe of 761 AGM approvals for our sample of 237 announcements. The ex ante average probability that a firm exercises its AGM permission is therefore roughly one third.

Insert Figure 2 here

For the empirical analyses of announcement effects we excluded four observations because shares were not repurchased over the open market but through tender offers and another nine because coincident confounding news such as board changes or windfall profits was released on the announcement date.<sup>9</sup> This left us with a total sample of 224 observations for which we measure price effects of share buy-back announcements. The same sample is used to investigate the determinants of these price effects by means of OLS-

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<sup>9</sup> Only those confounding events have been considered relevant which stood in no obvious connection with the share buy-back itself. We assume that price effects from any coinciding news that are directly related to the share buy-back such as financial forecasts cancel out on average across the total sample.

regressing abnormal returns with the following variables. Table 3 below shows the corresponding descriptive statistics.

- **MTB:** The Market-to-Book ratio is defined as the market value of equity two days before the announcement date divided by the book value of equity as reported in the most recent financial statements prior to announcement.<sup>10</sup> Low market-to-book equity ratios indicate an assessment of investors that the firm in question possesses poor investment opportunities (BAGWELL/SHOVEN 1988). We argue that a low ratio tends to increase the perceived potential for an undervaluation of a firm's stock. Signaling by means of announcing a share repurchase transaction might then trigger a reassessment of investment opportunities. Lower market-to-book ratios might then be associated with stronger price effects. The prevalence of long-term mean reversion in stock returns, which was recently documented by MOERSCHEN/SCHIERECK (2003) for the German equity market, might reinforce this relationship. A further explanation for any observed negative correlation between MTB and price effects is associated with agency conflicts between management and owners. Poor investment opportunities might imply more financial slack, so that the decision by managers to pay out excess cash is especially welcomed by investors in these situations.
- **SIZE:** Firm size is expressed by the logarithm of its enterprise value. Enterprise value is defined as the sum of the market value of equity and the book value of interest bearing debt.<sup>11</sup> Size is treated as a proxy for the extent of information asymmetries between a firm and the capital markets. The larger a firm, we argue, the more information is publicly available due to more stringent disclosure requirements and stronger analyst coverage. *Ceteris paribus*, buy-back announcements that serve the purpose of signaling an undervaluation should convey more information to investors in the case of smaller firms.
- **NMLISTING:** This dummy variable is set to 1 if the firm was traded on the Neuer Markt - a by now abolished segment of the German stock exchange for young and innovative firms. Like SIZE, NMLISTING also serves as a proxy for information asymmetries between the company and its investors. Firms listed on the Neuer Markt

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<sup>10</sup> Table 5 below shows that MTB is uncorrelated with the cumulative stock price returns over a 30-day interval before the announcement date. We therefore assume (and we will verify this assumption in the next version of this paper) that using the market value on day -2 before the announcement date as the nominator of MTB does not distort our regression results.

<sup>11</sup> We refrained from subtracting the cash position from debt value to avoid negative enterprise values for some firms.

are typically characterized by shorter track records and a higher degree of uncertainty regarding future industry prospects than more mature firms listed on other exchange segments. As a consequence, signals should be stronger for Neuer Markt firms.

- **PASTRETURN:** This variable measures the cumulated returns of a firm's stock over the 30 day-period prior to our event window [-31;-2]. The worse the performance, the larger is arguably the potential for undervaluation and the more might therefore the market treat buy-back announcements as credible undervaluation signals. We use returns instead of abnormal returns, because we expect both, management's assessment of undervaluation and management's timing of an undervaluation signal to depend on the past absolute return on the stock rather than on its return relative to the market return.<sup>12</sup>
- **UNDERVAL:** This dummy variable is set to 1 if a firm states "undervaluation" as a main motive for repurchasing own shares. Although German firms are not legally obliged to disclose their motives for share buy-backs, it is common practice that they provide such information in the press release which contains the repurchase announcement itself. Out of the 224 firms in our final sample, 185 disclosed their motives.<sup>13</sup> In many cases, more than one motive was stated. Table 2 below reports the total number of declarations and the percentage of firms per type of motive. 96 or roughly one half of the firms stated a perceived undervaluation of their stock as one reason to buy back shares.<sup>14</sup> Because the cost for the firm associated with this statement is virtually zero, the statement should actually not be a credible signal to the market. Hence we would expect to observe no difference in announcement effects between firms stating different motives.

Insert Table 3 here

- **CASH:** This variable is defined as the amount of liquid assets over the book value of equity. It is used as an – albeit weak – measure for the amount of free cash that is at management's disposal. If free cash flow is large, investors might welcome share buy-backs as a means of avoiding management consumption of private benefits.
- **CONTROL25, CONTROL50 and CONTROL75:** These dummy variables are set to 1 if the portion of combined holdings of the two largest shareholders in a firm's total

<sup>12</sup> Using cumulative abnormal returns instead leaves our empirical results virtually unchanged.

<sup>13</sup> UNDERVAL was set to zero for the 39 firms that did not specify their motives.

<sup>14</sup> In the Canadian sample of LI/MCNALLY (1999), more than two thirds of the 183 firms stated undervaluation as their main motivation.

outstanding shares lies in a specific range. CONTROL25 is 1 for holdings greater or equal to 25% and below 50% of total shares outstanding. CONTROL50 is 1 if holdings are greater or equal 50% and smaller than 75%. CONTROL75 is 1 if holdings are 75% or greater. We thereby attempt to measure any price effects that might arise from a firm's specific governance structure. If a firm is controlled by only a few large blockholders, minority shareholder have to fear that large blockholders exercise their power in their own interest, e.g. by inducing the firm's management (which might actually be identical with or at least closely related to blockholders in the case of manager- and family-controlled firms) to transact with them at favorable terms or to invest in projects that one-sidedly benefits them.<sup>15</sup> If the extraction of private benefits by large shareholders is indeed prevalent, one should expect larger abnormal returns for firms with concentrated ownership. In these cases, buy-backs imply an unexpected payout of cash that might have already been written off by minority shareholders.

- TARGET: We introduce this dummy variable to test whether investors' perceptions that a buy-back transaction might primarily be used to fend off a takeover lead to lower abnormal returns. Since we cannot observe investors' perceptions directly, we searched for constellations where share repurchases bore the potential of reducing the free-float down to a level that would have made it difficult for raiders to accumulate a controlling stake over the open market and where managers and family owners, respectively, had a substantial but non-controlling equity stake in the firm. In these constellations, management and owner families may fear that outside raiders take over control of the firm and subsequently curb any existing opportunities for incumbents to extract private benefits from the firm. We set TARGET to 1 if the free float was smaller than 25% and if the combined stake of managers and family owners was between 25% and 50% shortly before the announcement date.<sup>16</sup>
- FINANCIAL and SERVICE: We introduced two industry dummies to control for industry effects. FINANCIAL is 1 if a firm belongs to the financial services sector and

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<sup>15</sup> EHRHARDT/NOWAK (2002) show in their empirical analysis that private benefits for family blockholders can indeed be very large in German firms and that stocks of firms, where founding families own more than 75% underperformed their peers significantly over a three-year period. NENOVA (2003) finds that the value of corporate voting rights, which can be interpreted as a lower bound for actual private benefits of the controlling shareholders was more than twice as high in Germany than in the US in 1997.

<sup>16</sup> Because managers affiliated with the owner family might carry a different surname, we were not able to distinguish between managing families and pure owner families. Another weakness of the TARGET dummy is that the filtering rule implicitly assumes that a raider can only buy shares from minority shareholders but not from other non-family and non-manager blockholders. However, because TARGET is equal to 1 only for 8% of the observations, the subset of falsely categorized observations is arguably quite small.



SERVICE is 1 if a firm belongs to all other service industries, respectively. For firms from the manufacturing industry both dummies are set to zero.

Insert Table 3 here

We did not collect data on the volume of shares actually repurchased after the announcement. That is because this information was not available to investors at the announcement date and therefore should not have an impact on share price. Another variable, for which we tried to collect data is the fraction of shares that was in the hands of the firm's managers and their families. Unfortunately, however, it was not possible in the majority of cases to identify whether managers were indeed associated with any owner family.<sup>17</sup>

## 5. Empirical Results

### *Abnormal Returns on the Announcement Date*

Figure 3 below plots average abnormal stock returns for the 224 observations in our sample. Day zero marks the respective event date at which firms announced to repurchase shares over the open market. The average abnormal return on this day is 4.9%, with 78% of the sample firms showing positive abnormal returns. Average cumulative abnormal returns around the announcement date are even larger: roughly 6% for the time window  $[-1;+1]$  and almost 7% for the time windows  $[-1;+5]$  and  $[-1;+10]$ .<sup>18</sup> All return figures are significantly different from zero at the 1%-level, implying that announcements incorporate information effects. Moreover, Figure 5 indicates that share prices of sample firms experienced a conspicuous abnormal downward trend over the 30 trading days before the event date. COMMENT/JARRELL (1991) document a very similar pattern in their analysis of some 1,200 US open market repurchase programs. Announcements are preceded by negative net-of-market stock performance and positive excess price effects reverse about half of this underperformance.

Insert Figure 3 here

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<sup>17</sup> The simple approach to map the names of managers with the names of shareholders surely substantially underestimates the true extent to which managers (and their families) have a stake in the firm. Therefore it did not come at a surprise to us that such a narrowly defined variable of manager ownership did not carry a significant coefficient in any regression model of this paper. We hence dropped the variable altogether.

<sup>18</sup> The percentage of sample firms with positive cumulative abnormal decrease with the length of the event window: 73% for  $[-1;1]$ , 72% for  $[-1;5]$  and 66% for  $[-1,10]$ .

### ***Regression Results***

Table 4 presents the results of six OLS regressions using the White correction for heteroskedasticity. The full model includes all twelve independent variables. For the reduced model we have dropped three variables that are strongly correlated (correlation coefficients exceeding 0.25 – see Table 6 below) to one or more of the other variables.

Price effects from buy-back announcements are on average greater for firms with lower market-to-book ratios (MTB), for smaller firms (SIZE), for firms listed on the Neuer Markt (NMLISTING), for firms that experienced lower share price returns prior to announcement (PASTRETURN) and for firms that stated undervaluation as a motivation for the share repurchase (UNDERVAL). For the other variables results are more ambiguous. The coefficients of both CONTROL25 and CONTROL50 are negative but not significant. The coefficient of CONTROL75 always carries a positive sign but is only weakly significant for the reduced model and CAR[-1;1]. Price effects from buy-backs that are potentially perceived as a takeover defense device are virtually zero on the announcement day but strongly negative (and slightly significant) when measured over a two- or eleven-day observation period (TARGET). Finally, the amount of cash on a firm's books does not seem to affect share price reactions at all (CASH).

We interpret these results as strong evidence for the validity of the signaling hypothesis. Investors seem to be more willing to update their beliefs regarding a firm's future prospects if the potential for an undervaluation of the firm's equity is greater and if the signal is more credible. Above, we argued that this tends to be case if past share price returns and market-to-book ratios are low and if information asymmetries between managers and investors are large, which themselves can be assumed to be a negative function of firm size. The fact that past absolute (and also past abnormal) share price returns explain announcement effects indicates a deliberate timing of the announcement by management<sup>19</sup>, supporting the view that firms use buy-backs to signal undervaluation.

Surprisingly, statements by managers that they view their firm as undervalued also seem to have measurable effects on abnormal returns. Cumulative abnormal returns between day -1 and day +10 are on average more than five percentage points higher for firms that made such a statement. Because the statement itself is virtually costless and

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<sup>19</sup> Given a deliberate timing, one should not observe too many instances where the steep decline in stock price that potentially triggered the buy-back announcement had been pre-empted by one or more intervals with similarly negative returns. We are currently analyzing the entire history of (abnormal) returns following the AGM approval and will report the results of this analysis in the next version of this paper.

therefore can be assumed to lack credibility, we are inclined to treat this result very cautiously. We rather suspect that unobserved firm characteristics that are correlated to the variable UNDERVAL are responsible for this result.

Insert Table 4 here

The negative coefficients of the TARGET variable provides some, albeit very weak evidence for a negative relationship between abnormal returns and the perception by investors that a buy-back transaction aims at fending off a (potential) hostile takeover. The fact that coefficients for TARGET are only negative for wider event windows and only very weakly significant for [-1;10] points at a large degree of initial uncertainty regarding the true motives of management that can only be resolved after (time-consuming) further investigations.

Insert Table 5 here

We find no evidence corroborating the free cash-flow hypothesis. In the last section we argued that low market-to-book ratios in conjunction with large cash positions might indicate financial slack on a firm's books. Share repurchases reduce financial slack and thereby potentially mitigate agency problems between managers and owners, which should have a positive impact on share prices. Although MTB carries the expected sign in Table 4, we do not observe any clear relationship between abnormal returns and a firm's cash position. In an extended model specification we also analyzed the explanatory power of a newly defined variable MTB/CASH. Again, coefficients were statistically insignificant.

The ownership structure of a firm - as captured by the three CONTROL variables - does not seem to have a measurable bearing on abnormal announcement returns. The positive and weakly significant coefficients of CONTROL75 might hint at mounting expectations by minority shareholders that they will get squeezed out by majority owners in the near future. If minority shareholders anticipate receiving a premium over market price at that future date, price elasticity can be expected to be even higher.

We are not able to test directly the validity of the tax-efficiency hypothesis which presumes that a firm should distribute excess cash through share repurchases if dividend payouts implied a higher tax burden to its shareholders. Prior to 1999 capital gains were taxed only slightly lower than income from dividends for tax payers in the highest tax bracket (56% versus 61.3%). As a consequence of recent German tax reforms, capital gains from share repurchases now lead to a much lower tax burden for this clientele than

dividend payouts (38,4% versus 59,1% in 2001 and 54,4% in 2002 and 2003). Over our observation period from 1998-2003 investors in higher tax brackets should have therefore preferred share repurchases to dividend payouts, especially in the year 2001, when capital gains were tax advantaged over dividends by more than 20 percentage points. Since we do not observe a sharp increase in share-buy back activity after 1999 we feel safe to conclude that tax efficiency is probably not an important motive of German managers to repurchase shares.<sup>20</sup>

### ***Abnormal Returns from Statements by Management to Seek AGM Approval for a Buy-Back Plan***

Given that buy-back announcements lead on average to strong abnormal price reactions, any prior event that implies a substantial increase in the probability that such an announcement will eventually occur should also affect share price. The intricacies of German laws governing buy-back plans give rise to such a prior event, namely the initial statement by management that it will seek AGM approval for a buy-back plan. In this section, we first estimate the magnitude of abnormal returns at that early stage and then compare our estimate to the empirical evidence.

Price reactions ( $R_A = 1 + r_A$ ) at the early date A, at which a firm publicly states its intention to seek AGM approval, should be a positive function of the expected abnormal share price appreciation on the later announcement date B ( $R_B = 1 + r_B$ ) and the probability  $p$  that investors assign to the actual future occurrence of a buy-back announcement. Taking on the perspective of investors who want to identify the maximum share price appreciation  $R_A$  at which it is no longer worthwhile to buy the stock in question, we can write<sup>21</sup>

$$(5) \quad R_A = p (R_A R_B) + (1-p) 1 .$$

Collecting terms and solving for  $R_A$  yields

$$(6) \quad R_A = (1-p) / (1-p R_B) .$$

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<sup>20</sup> According to the Deutsches Aktieninstitut, the total volume of dividend disbursements by German corporations has increased from 74 billion Euro in 1999 to 79 billion Euro in 2000. The lack of a sharp increase in buy-backs can therefore not be explained by a decline in total cash disbursements to shareholders.

<sup>21</sup> For the sake of simplicity we implicitly assume risk neutral investors and a discount rate of zero.

From section 4 we know that only roughly one third of all firms that sought AGM approval actually announced a buy-back transaction during the subsequent 18 months. Setting  $p = 1/3$  and  $R_B = 1.07\%$  (see Figure 5 above) yields an estimate for  $R_A$  of 1.036. One should therefore expect to observe average abnormal returns of roughly  $r_A = 3.6\%$  when new information about a firm seeking AGM approval arrives on the market.

To verify this estimate we performed a new search in the news- and ad hoc databases mentioned above to find initial statements by firms that they are about to seek AGM approval for a buy-back plan. To avoid a selection bias, we did not restrict ourselves to the 181 firms that subsequently announced a repurchase transaction. This new search strategy yielded over 300 observations. However, we had to drop the majority of observations because the sought-after statements were part of a more comprehensive disclosure of multiple statements by the firm in question and because it was impossible to pinpoint the exact date of the statement, respectively (e.g. because the statement was part of the invitation letter to the AGM). The final sample comprises 111 observations that are fairly evenly distributed across the observation period. We then re-applied the methodology from section 4 to plot average abnormal returns around the date A. Figure 4 below shows that the average  $r_A$  is larger than 5% for most event windows and therefore exceeds our estimate of 3.6% considerably.

Insert Figure 4 here

We offer three explanations for this discrepancy. Firstly, abnormal returns might be distorted by confounding events on dates A and B, respectively, or by a selection bias regarding the observations for date A. Secondly, investors might have been overly optimistic regarding the true probability that an initial statement to seek AGM approval for a buy-back plan will indeed be followed by a later announcement to repurchase shares. On the same token, one might also call into question the credibility of such an initial statement, because the only cost to be incurred by firms that send a false signal are reputation losses. The third explanation assumes that investors behave rationally and that signaling is indeed costly. If this holds true we must have so far overlooked additional events C in the interim period between dates A and B or after date B that are associated with positive abnormal returns on average. The AGM approval and any actual open-market buy-back transactions are candidates for these missing events. By solving (5) for the implied  $R_B$  and dividing  $R_B$

by the observed abnormal return  $R_B' = 1.07$  on date B we can estimate the expected average abnormal return ( $R_C$ ) for these missing events.

$$(7) \quad R_C = (R_A - 1 + p) / (p R_A R_B')$$

Entering  $R_A = 1.05$ ,  $p = 1/3$  and  $R_B' = 1.07$  into equation (7) yields  $R_C = 1.024$ . Given that the third explanation is correct, the total cumulative abnormal return from implementing a repurchase plan amounts to  $R_A * R_B' * R_C - 1 = 15.0\%$ . Given that the second explanation is correct (no omitted event), the implied total return decreases to  $R_A * R_B' = 12.4\%$ . Compared to the results of event studies for other countries (see Table 1), this average price effect from open-market share repurchases by German firms is remarkably high.

We can only speculate why this is the case. Information asymmetries between managers and (outside) investors might be larger for German firms than for firms from market based financial systems such as the US or the UK. LEUZ/WÜSTEMANN (2004) show in detail that the role of the German accounting system is not so much to disseminate information to the capital markets but rather to support private information channels to privileged inside investors like “Hausbanks” and blockholders. Empirical studies indeed show that the information content of financial statements is less value relevant and less timely than in the US or the UK<sup>22</sup>. As a consequence, additional public disclosures by German firms might embody relatively more relevant information content than in the Anglo-Saxon countries. If the extent of information asymmetries were indeed the main determinant of country differences in announcement effects, one should in turn expect to observe similar differences in abnormal returns from announcements regarding other financing decisions of firms. However, GEBHARDT (2001) documents in his overview of selected empirical studies that neither announcements of changes in dividend payouts nor announcements of seasoned equity offers seem to result in higher market variations for German firms than for US firms.

We therefore conjecture that the strict German legal provisions that govern the entire buy-back process from the ex ante obligation to obtain AGM approval to the ex post obligation to disclose the details of any transactions on the subsequent AGM provide for a higher credibility of buy-back announcements as undervaluation signals than in the US context. In the US, investors can only infer from buy-back announcements that firms intend

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<sup>22</sup> See e.g. JOOS/LANG (1994) and HARRIS ET AL. (1994).

to repurchase own shares. Investors cannot deduce, however, any obligation by the firm to imminently engage in a repurchase transaction. Further research should investigate whether other countries with high observed abnormal returns (such as Japan) possess legal ramifications that are prone to enhance any undervaluation signal from buy-back announcements.

## 6. Conclusion

This paper analyzes share price effects from buy-back announcements of German corporations. We observe high negative pre-announcement abnormal returns and high positive post-announcement returns and therefore confirm the empirical results of prior US and international event studies for Germany. Moreover, our regression analysis corroborates the undervaluation signaling hypothesis. Firm-specific<sup>23</sup> variables such as market-to-book ratio and firm size, which attempt to capture the potential for undervaluation and potential information asymmetries between managers and outside investors were found to be closely related to the magnitude of price effects. We find no evidence in support of the excess cash hypothesis, according to which firms repurchase shares with excess cash in order to alleviate agency conflicts.

The legal requirement that German corporations must first obtain shareholders' authorization before repurchasing shares allows us to also analyze another, preceding event in the buy-back context, namely the initial statement by management to seek shareholders' authorization. Also for this second event, we find highly positive abnormal share price reactions. The fact that implied total abnormal returns from implementing buy-back plans seem to be extraordinarily high when compared to share price effects observed for other countries poses a research puzzle. We conjecture that differences in the legal requirements for conducting buy-back programs are the main determinant for international differences in average price effects.

Our empirical result regarding strong price effects on the announcement date reinforces the legal requirement for German firms to report an imminent buy-back

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<sup>23</sup> In a separate regression not reported in the last section we tested whether the undervaluation signal contains any relevant industry-wide information. For that purpose, we constructed a set of weighted share price indices. Each index covered the entirety of C-DAX firms from a particular industry but not the one firm that announced a buy-back. For the announcement date of a given firm, we then measured abnormal returns for the corresponding industry index. The average abnormal returns that we obtained were statistically not different from zero, thus largely ruling out industry-wide effects.

transaction by means of a public ad-hoc disclosure. Given that the preceding, initial statement by managers to seek AGM approval also causes considerable market variations, we are inclined to suggest that such a statement should also be subject to legal ad-hoc disclosure requirements. Otherwise, opportunities remain for trading by informed insiders which was prohibited back in 1994 by the 2<sup>nd</sup> Financial Market Promotion Act. Figure 4 above shows positive abnormal returns in the five days before the concerned voluntary statement, thus indicating that insider trading might have indeed occurred in the context of repurchase transactions by German firms.



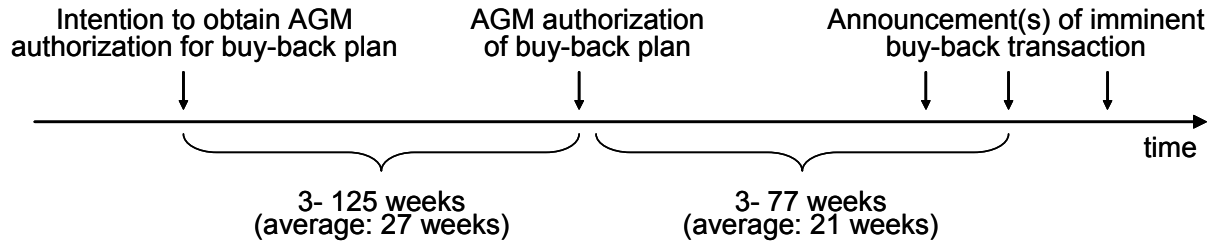
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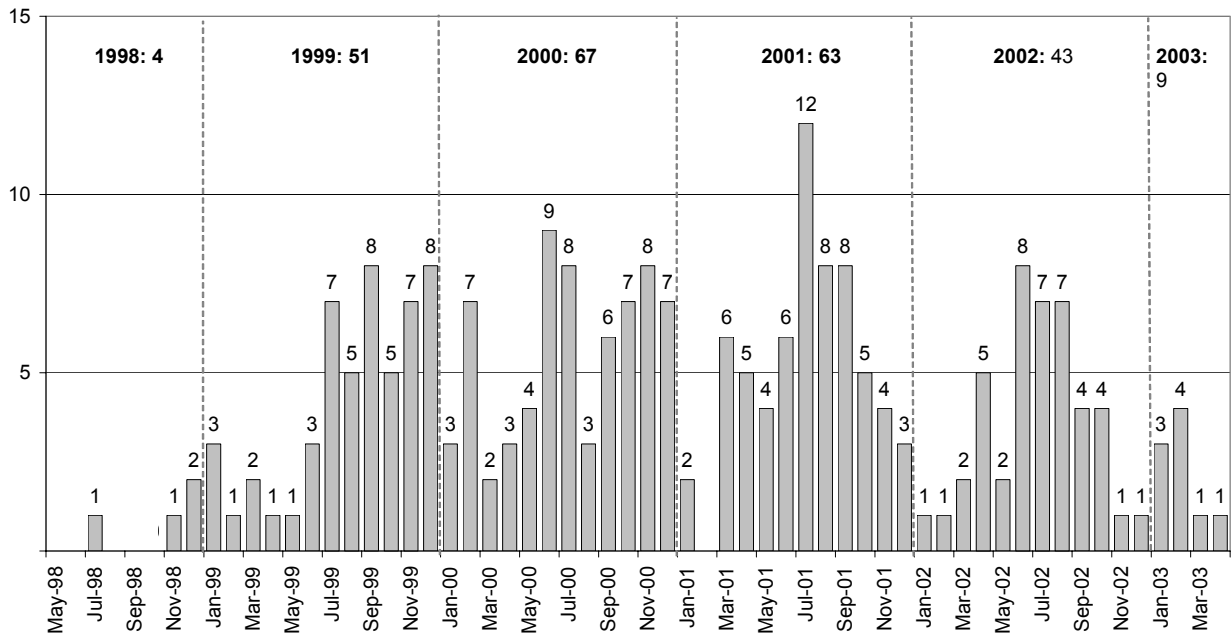
**Figure 1: Time line of share buy-backs in Germany (N=224)**



**Table 1: Prior empirical results on abnormal returns from announcing open-market repurchase programs (OMR)**

| Country   | Study                    | Abnormal Returns    | Dataset                      |
|-----------|--------------------------|---------------------|------------------------------|
| U.S.      | McNally (1999)           | CAR [-1;+1]: 2.3%   | 451 OMR (1985-1988)          |
|           | Vermaelen (1981)         | CAR [-1;+1]: 3.7%   | 243 OMR (1970-1978)          |
|           | Stephens/Weisbach (1998) | CAR [-1;+2]: 2.7%   | 591 OMR (1981-1990)          |
|           | Ikenberry et al (1995)   | CAR [-2;+2]: 3.5%   | 1,239 OMR (1980-1990)        |
|           | Comment/Jarrell (1991)   | CAR [-1;+1]: 2.3%   | 1,157 OMR (1985-1988)        |
| Canada    | Li/McNally (1999)        | CAR [-2;+2]: 3.6%   | 183 OMR (1989-1992)          |
|           | Ikenberry et al (2000)   | CAR [-15;+15]: 0.9% | 1,060 OMR (1989-1997)        |
| Germany   | Schremper (2002)         | CAR [-1;+1]: 4.1%   | 112 (mostly) OMR (1998-2000) |
|           | Gerke et al (2002)       | CAR [-1;+1]: 6.1%   | 156 OMR (1998-2000)          |
| U.K.      | Raghavendra et al (2002) | CAR [-5;+5]: 1.1%   | 264 OMR (1985-1998)          |
|           | Oswald/Young (2002)      | CAR [-1;+1]: 1.4%   | 266 (mostly) OMR (1995-2000) |
|           | Lasfer (2000)            | CAR [-2;+2]: 1.6%   | 465 (mostly) OMR (1985-1998) |
| France    | Ginglinger/L'Her (2002)  | CAR [-1;+1]: 0.7%   | 363 OMR (1998-1999)          |
| Brazil    | Moreira/Procianoy (2001) | CAR [-1;+1]: 0.03%  | 110 OMR 1997-1998)           |
| Japan     | Zhang (2000)             | CAR [-1;+2]: 6.0%   | 39 OMR (1995-1999)           |
| Australia | Lamba/Ramsay (2000)      | CAR [-1;+1]: 3.3%   | 103 OMR (1989-1998)          |
|           | Otchere/Ross (2000)      | CAR [-1;+1]: 4.3%   | 132 OMR (1991-1999)          |
| Korea     | Jung (2003)              | CAR [0;+5]: 2.8%    | 382 OMR (1994-1998)          |

**Figure 2: Share buy-back announcements in Germany (May/1998 – April/2003)**



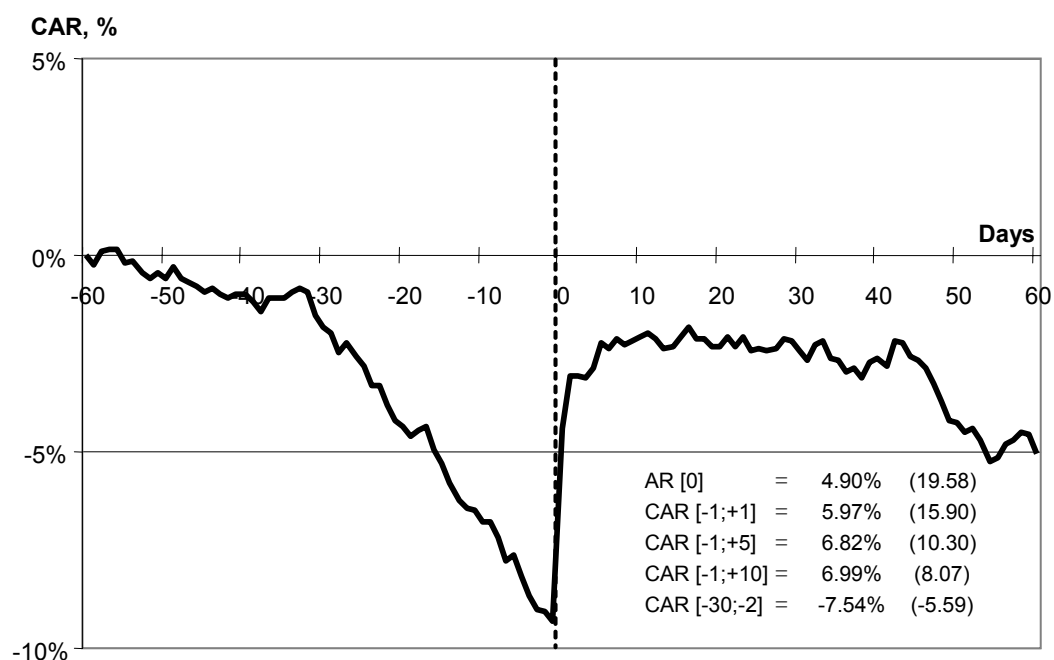
**Table 2: Motives for share buy-backs as declared by management (N=185)**

|  | Number of<br>declarations | Percent of<br>185 sample firms |
|--|---------------------------|--------------------------------|
| Acquisition currency                   | 107                       | 58%                            |
| Undervaluation                         | 96                        | 52%                            |
| Employee participation programs        | 32                        | 17%                            |
| Cancellations/pay-outs to shareholders | 27                        | 15%                            |
| Other                                  | 5                         | 3%                             |
| Sum                                    | 267                       |                                |

**Table 3: Descriptive statistics (N=224)**

|        | Dependent variables |            |             | Independent variables |       |             |        | Independent dummy variables |      |                |      |
|--------|---------------------|------------|-------------|-----------------------|-------|-------------|--------|-----------------------------|------|----------------|------|
|        | AR[0]               | CAR [-1;1] | CAR [-1;10] | MTB                   | SIZE  | PAST RETURN | CASH   | Averages                    |      |                |      |
| Max.   | 40.6%               | 36.8%      | 56.5%       | 14.80                 | 11.55 | 49.6%       | 125.3% |                             |      |                |      |
| Min.   | -13.6%              | -18.5%     | -36.6%      | 0.18                  | 1.76  | -71.8%      | 1.3%   | <b>NMLISTING</b>            | 0.43 | <b>TARGET</b>  | 0.08 |
| Avg.   | 4.9%                | 6.0%       | 7.0%        | 2.55                  | 5.49  | -11.1%      | 39.3%  | <b>UNDERVAL</b>             | 0.43 | <b>CONT.25</b> | 0.33 |
| Median | 3.1%                | 4.6%       | 5.0%        | 1.71                  | 5.06  | -7.6%       | 32.1%  | <b>SERVICE</b>              | 0.29 | <b>CONT.50</b> | 0.35 |
| Stdev. | 7.8%                | 9.4%       | 14.3%       | 2.78                  | 2.10  | 21.2%       | 30.4%  | <b>FINANCIAL</b>            | 0.13 | <b>CONT.75</b> | 0.11 |

**Figure 3: Average cumulative abnormal returns from buy-back announcements (N=224)**



Note: t-statistics in parentheses

**Table 4: OLS regression with robust standard errors (N=224)**

|                | AR[0]                | CAR[-1;1]            | CAR[-1;10]            | AR[0]                | CAR[-1;1]            | CAR[-1;10]            |
|----------------|----------------------|----------------------|-----------------------|----------------------|----------------------|-----------------------|
| CONSTANT       | 11.53%***<br>(0.000) | 11.63%***<br>(0.001) | 15.02%***<br>(0.003)  | 11.60%***<br>(0.000) | 12.69%***<br>(0.000) | 13.53%***<br>(0.000)  |
| MTB            | -0.51%***<br>(0.000) | -0.45%***<br>(0.003) | -0.69%**<br>(0.013)   | -0.44%***<br>(0.001) | -0.38%***<br>(0.009) | -0.63%**<br>(0.020)   |
| SIZE           | -0.93%***<br>(0.001) | -1.00%***<br>(0.001) | -1.29%***<br>(0.003)  | -1.01%***<br>(0.000) | -1.13%***<br>(0.000) | -1.26%***<br>(0.001)  |
| NMLISTING      | 2.95%***<br>(0.006)  | 2.43%*<br>(0.058)    | 2.31%<br>(0.266)      |                      |                      |                       |
| PASTRETURN     | -3.13%<br>(0.243)    | -7.430%**<br>(0.033) | -13.56%***<br>(0.001) | -3.94%<br>(0.155)    | -7.95%**<br>(0.026)  | -14.09%***<br>(0.001) |
| UNDERVAL       | 0.91%<br>(0.369)     | 1.83%<br>(0.125)     | 5.12%***<br>(0.007)   | 1.35%<br>(0.172)     | 2.10%*<br>(0.068)    | 5.59%***<br>(0.002)   |
| CASH           | 0.09%<br>(0.957)     | 1.56%<br>(0.406)     | -0.45%<br>(0.871)     |                      |                      |                       |
| TARGET         | 0.21%<br>(0.922)     | -3.25%<br>(0.141)    | -5.81%<br>(0.127)     | 0.36%<br>(0.873)     | -3.25%<br>(0.131)    | -5.80%<br>(0.113)     |
| CONTROL25      | -2.09%<br>(0.183)    | -1.42%<br>(0.414)    | -2.98%<br>(0.227)     |                      |                      |                       |
| CONTROL50      | -1.41%<br>(0.340)    | -1.26%<br>(0.490)    | -2.00%<br>(0.437)     |                      |                      |                       |
| CONTROL75      | 0.23%<br>(0.902)     | 3.05%<br>(0.155)     | 2.40%<br>(0.500)      | 0.91%<br>(0.571)     | 3.39%*<br>(0.065)    | 3.84%<br>(0.230)      |
| SERVICE        | -2.78%**<br>(0.030)  | -3.60%**<br>(0.013)  | -4.63%**<br>(0.048)   | -2.65%**<br>(0.034)  | -3.44%***<br>(0.018) | -4.67%**<br>(0.042)   |
| FINANCIAL      | -2.24%*<br>(0.079)   | -2.98%*<br>(0.054)   | -3.65%*<br>(0.080)    | -3.02%**<br>(0.018)  | -3.55%**<br>(0.020)  | -4.28%**<br>(0.041)   |
| R <sup>2</sup> | 0.218                | 0.216                | 0.216                 | 0.184                | 0.196                | 0.177                 |
| F Stat         | 4.51                 | 3.98                 | 4.53                  | 5.21                 | 5.426                | 6.998                 |
| Significance F | 0.000                | 0.000                | 0.000                 | 0.000                | 0.000                | 0.000                 |

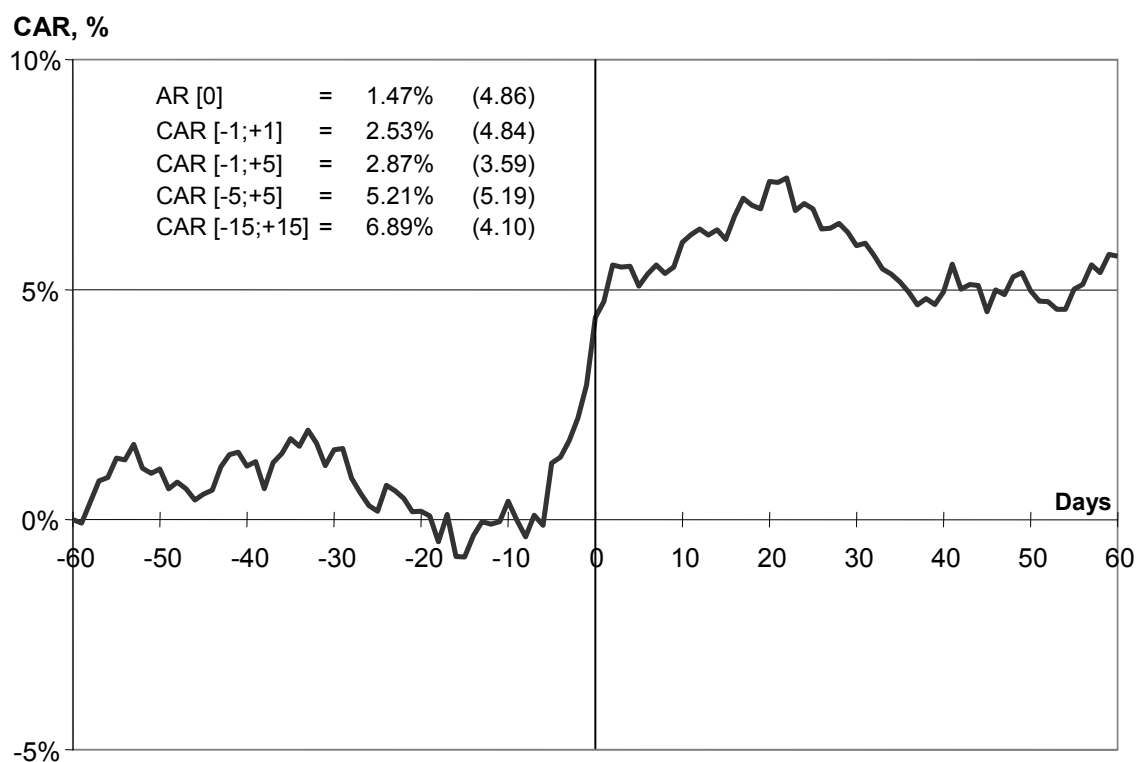
Notes: Reported results are OLS regression coefficients with robust standard errors (p-values in parentheses).

\*\*\* significant at least at the 1%-level, \*\* significant at least at the 5%-level, \* significant at least at the 10%-level

**Table 5: Correlation matrix for independent variables (N=224)**

|            | MTB   | SIZE         | NM<br>LISTING | PAST<br>RETURN | UNDER<br>VAL | CASH  | TAR<br>GET | CONT.<br>25  | CONT.<br>50  | CONT.<br>75 | SER<br>VICE |
|------------|-------|--------------|---------------|----------------|--------------|-------|------------|--------------|--------------|-------------|-------------|
| SIZE       | 0.19  |              |               |                |              |       |            |              |              |             |             |
| NMLISTING  | 0.01  | <b>-0.34</b> |               |                |              |       |            |              |              |             |             |
| PASTRETURN | 0.01  | 0.11         | -0.05         |                |              |       |            |              |              |             |             |
| UNDERVAL   | -0.08 | -0.12        | 0.16          | -0.06          |              |       |            |              |              |             |             |
| CASH       | 0.01  | -0.22        | 0.25          | 0.07           | -0.04        |       |            |              |              |             |             |
| TARGET     | -0.07 | -0.17        | 0.16          | -0.05          | 0.06         | 0.02  |            |              |              |             |             |
| CONTROL25  | -0.02 | -0.09        | 0.13          | -0.10          | -0.04        | -0.04 | 0.05       |              |              |             |             |
| CONTROL50  | 0.01  | -0.23        | 0.11          | 0.02           | 0.05         | 0.05  | 0.14       | <b>-0.52</b> |              |             |             |
| CONTROL75  | 0.00  | -0.05        | -0.18         | -0.01          | -0.07        | -0.13 | -0.10      | <b>-0.27</b> | <b>-0.25</b> |             |             |
| SERVICE    | -0.05 | -0.23        | 0.22          | 0.08           | 0.00         | 0.05  | 0.00       | 0.15         | 0.05         | -0.06       |             |
| FINANCIAL  | 0.11  | 0.13         | <b>-0.28</b>  | -0.02          | -0.07        | -0.21 | -0.11      | -0.08        | -0.11        | 0.21        | -0.24       |

**Figure 4: Average cumulative abnormal returns from statements to seek AGM approval for a buy-back plan (N=111)**



Note: t-statistics in parentheses



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